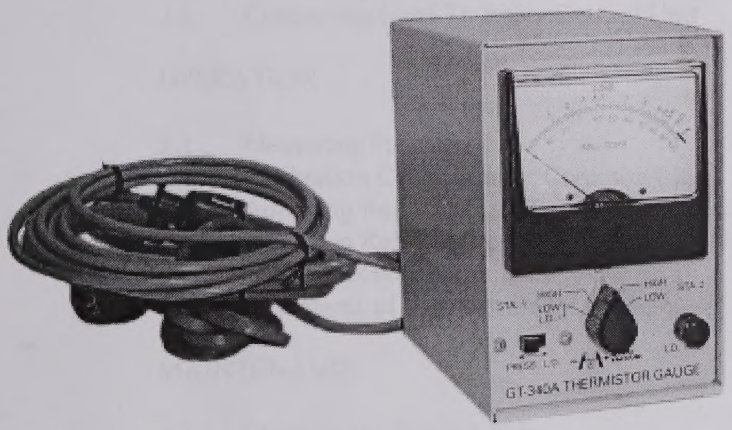
Instruction Manual For
Thermistor Gauge
GT-340A



Myers Vacuum
RD # 2 Box 247A
Kittanning, PA 16201
Phone: 724-545-8331
Fax: 724-545-8332

Digitized by the Internet Archive
in 2026

https://archive.org/details/manualsplus_11536

TABLE OF CONTENTS

SECTION	DESCRIPTION
1.0	INTRODUCTION
	1.1 Product Description
	1.2 Operating Principles
	1.3 Specifications
2.0	INSTALLATION
	2.1 Unpacking
	2.2 Installing the Pressure Sensing Tube
	2.3 Electrical Connections
	2.4 Adding A Second Optional Sensing Station
	2.5 Connecting Pressure Recorder
	2.6 Connecting Load To Relay Control Unit
3.0	OPERATION
	3.1 Measuring Pressure
	3.2 Calibration Correction for Common Gases
	3.3 Adjusting Relay Control Trip Point-Type GT-345A Gauge
	3.4 Adjusting Relay Hysteresis – Type GT-345A Gauge
	3.5 Leak Detection Techniques
	3.6 Operations of the Leak Detect Feature
4.0	MAINTENANCE
	4.1 Cleaning the Sensing Tube
	4.2 Re-calibration
5.0	REPLACEMENT PARTS LISTS
6.0	ACCESSORIES
7.0	SCHEMATIC
8.0	ASSISTANCE FROM MYERS VACUUM

THERMISTOR VACUUM GAUGE
TYPES GT-340A AND GT-345A

1.0 INTRODUCTION

1.1 Product Description

1.1.1 The Type GT-340 Thermistor Vacuum Gauge is a thermal conductivity type gauge using a bead thermistor as the sensing element. Pressure from zero to atmosphere is covered on two-meter ranges. The gauge can be equipped with either one or two pressure sensing stations. Terminals are provided for recording the output of either or both stations, independent of the station selector switch position.

This gauge is equipped with a Leak Detect switch and adjustment potentiometer by means of which the gauge sensitivity can be greatly increased for purposes of hunting down leaks.

1.1.2 The GT-345A Controlling Type Thermistor Vacuum Gauge consists basically of a GT-340 Gauge Circuit plus a GT-005A Relay Control Unit, both mounted in a common cabinet. The gauge circuit provides a signal to the GT-005 control circuit. This signal is amplified and used to drive a power relay, thereby providing contacts, which switch in response to changes in pressure.

1.2 Operating Principles

The GT-340A Gauge Circuit consists of a voltage regulator which supplies a constant regulated voltage to a wheatstone bridge type detector circuit. One arm of the bridge contains the thermistor sensor, which is exposed to the vacuum to be measured. Normal current flow through the bridge heats the thermistor to approximately 190°C at pressures less than .001 torr. Increasing the pressure at the thermistor sensor causes its temperature to decrease (and its resistance to increase), thereby unbalancing the bridge circuit. The pressure meter responds to the bridge unbalance current and is calibrated in units of pressure.

When two pressure sensing stations are used, a double bridge is provided and the meter is switched from one bridge to the other in order to read pressure at the respective station. Both stations are continuously energized whenever the gauge is turned on. Recorder terminals connect to the output of each bridge.

In the GT-345A Controlling Gauge, the bridge output signal is connected in series with a variable reference voltage, to one input of an operational amplifier. The other input contains a positive feed-back network. The output of the operational amplifier is further amplified and then used to energize the power relay. Changing the reference voltage will change the pressure at which the relay will trip, and changing the-back ratio varies the hysteresis, or differential between pull-in and dropout, of the relay.

1.3 Specifications

1.3.1 GT-340A Thermistor Vacuum Gauge

Power Input	115/230 V 50/60 Hz 10 watts
Pressures Scales	
Low Range	0-100 millitorr in 2 millitorr increments
High Range	0-ATM, non-linear scale
Number of Sensing Stations	1 or 2
Recorder Output	0-2.5V (approx.), available continuously from either or both stations, independent of range switch positions. Recommended recorder impedance, 50,000 ohms or higher.
Pressure Sensing Tube	Type GT-034
Tubulation Vacuum Seal	1/8" pipe thread or .406" diameter O-Ring sealing surface.

Electrical Connection	Standard octal plug
Speed of Response	Intial start-up, 30-40 sec.
(Time to reach 90% of final reading)	100 m torr step change --- 6 sec.
Line cord	9 ft. length, 3 wire, with Grounding plug
Tube Cord	10 ft. length*, with octal plug
Cabinet Dimensions	4" wide x 6" high x 6 1/2" deep For bench or rack mounting

*See Section 6.0, Accessories, for longer cord lengths.

1.3.2 GT-005A Relay Control Unit

Power Input	115/230 V 50/60 Hz 10W
Trip Point Adjustment	
Low Range	0 to 0.6 volts (0 to 100m Torr)
High Range	0 to 2.75 volts (0 to ATM).
Hysteresis Adjustment	
Low Range	.055 to .500 volts
High Range	0.25 to 2.25 volts
Input Impendance	
Low Range	22K ohms
High Range	122K ohms
Relay Contacts (Energized)	SPDT, 3 amp, Contacts
Cabinet Dimensions	4" w x 6" h x 6-1/2" d **

**The GT-345A Gauge, which combines the GT-340A and GT-005A, is housed in a half-rack size cabinet 8" w x 6" h x 6-1/2" d.

2.0 INSTALLATION

2.1 Unpacking

Unpack and inspect the carton and contents for damage or shortages. Damages in transit are the normal responsibility of the Transportation Company and should be reported to them.

2.2 Installing the Pressure Sensing Tube.

The tube may be installed in any position. However, mounting position influences pressure reading above 10 torr. If this pressure range ifs of interest the tube should be mounted vertically with base up.

For accurate pressure response and freedom from zero drift, the tube elements must remain clean. Therefor, the tube should be installed so s to minimize the entrance of oil vapor or process contaminants.

Install the sensing tube in any of the following ways:

2.2.1 Thread the tubulation into a mating 1/8" pipe thread opening in the vacuum system. Seal the threads with Teflon tape, Celvaseal Leak Sealant (Part No. 271375), or other low vapor pressure sealing material.

Or

2.2.2 Use a type CGB compression connector to form an easy-to-open vacuum seal. This connector is basically an elastomer bushing enclosed in a metal envelope which threads into a 1/2" NPT tapped hole. Use connector (Part No. 61083), with 3/8" bushing (Part No. 61081-2).

Or

2.2.3 Place the end of the tubulation tightly against a similar-sized tube installed in the system and enclose the butt joint in a short piece of heavy-wall rubber vacuum tubing. Put a thin coat of vacuum grease, such as Celvacene-Medium, on the tubulation and the system connections. The grease lubricated the connecting parts and provides a vacuum seal.

2.3 Electrical Connections

Plug the tube cable into the sensing tube.

The gauge is factory wired for operation from a 115 volt power source. Plug the three-prong grounding type power cord into a suitable 115 volt, 50/60 Hz outlet.

2.3.1 Operation from a 230 Volt Power Circuit

To adapt the unit for 230-Volt 50/60 Hz operation, make the following adjustments:

1. Remove the four feet and slide the cover off the chassis.

2. On the GT-340A gauge unit, locate the taper pin connector on the end of the white line cord wire. Transfer this connection from the 115V taper pin socket to the 230V taper pin socket.

3. On the GT-345A gauge, perform the operation in step 2. In addition, move the white inter-unit connecting wire from taper pin socket 115 to pin socket 230 in the GT-340 unit. Then, in the GT-005A unit, move the jumper wire from 115V to 230V taper pin.

4. Replace the cover feet.

5. Change the voltage marking on the nameplate.

6. Replace the line cord plug with an approved 230-volt plug.

2.4 Adding A Second Optional Sensing Station

If the gauge has only one sensing tube, a second tube can be easily installed as follows.

2.4.1 Remove the four feet slide the cover off the chassis.

2.4.2 Remove the plug from the blank hole in the rear panel, and install the second station tube cable (Part No. 5505889-1). Secure in place with strain relief busing (Part No. 19366-1). Plug into the three taper pin connectors and solder into place the pins are marked STA 2, Red, Green and White. Be sure are tight.

2.4.3 Replace the cover and feet.

The gauge is now ready for operation. No calibration is normally required when adding a second station.

2.5 *Connecting Pressure Recorder.*

A three pin jack located on the rear panel of the GT-340A gauge unit are intended for connecting pressure recorders or for providing a pressure responsive signal to the GT-005A control unit. Use the wiring circuit in located on the rear of the unit when recording station 1 pressure.

To record station 2 pressure, make connections to "COM" and "STA" jacks. Both stations can be recorded simultaneously if desired, by using a 2-point recorder. Recorder signal voltages are not affected by the position of the range/selector switch on the GT-340A (except in the OFF position).

2.5 Connecting Load To Relay Control Unit

A relay-controlled output of the GT-005A unit is available at the 3 pin socket on the rear panel. Relay contact connections are marked on the panel. The relay contacts are rated at 125V AC, at 3 amperes.

The relay coil of the 005 is controlled by the signal from the gauge. Power must be supplied to the relay contacts.

3.0 OPERATION

3.1 Measuring Pressure

After proper installation and connection, the gauge may be turned on. Allow 1 minute for warm-up time. The thermistor gauge tubes are not harmed by operation at pressures up to full atmospheric pressure, but the selector switch should be in the High position.

NOTE: A meter overload protector is included in the circuit to prevent meter damage if the selector is switched to LOW while the pressure in the sensing tube is high. When first turned on, the meter will peg up-scale for approx. 20 seconds.

The pressure meter will indicate the pressure within the sensing tube in units of "Torr" on the upper scale. The gauge is calibrated for dry air. When the meter indicates less than 0.1 torr, the selector should be moved to the "LOW" position, and the pressure read on the lower scale in millitorr.

3.2 *Calibration Correction For Common Gases*

These gauges are calibrated for use in dry air. To determine the pressure of gases other than air, refer to graph 1.

3.3 *Adjusting Relay Control Trip Point – Type GT-345A Gauge*

The relay trip point is adjustable by means of the marked screw adjustment on the front panel. There are two ranges over which the GT-005A unit operated, as follows:

Low Range – zero to 0.6 volts. This range is used when controlling pressure below 100 mTorr.

High Range - Zero to 2.75 volts. This range is used when controlling pressure above 100 mTorr

The operating range can be selected by removing the cover and placing the black signal wire in the GT-005 unit into the appropriate taper pin socked. Be sure taper pin connections are tight.

Indicator lights on the front panel show which relay output circuit is energized.

3.4 Adjusting Relay Hysteresis – Type GT-345A Gauge

The hysteresis, or differential between relay pull-in and drop-out, is adjustable by means of the marked screw adjustment on the front panel.

3.5 Leak Detection Techniques

In using this gauge for locating leaks, it is necessary to allow the system pressure to stabilize. The suspected area is then probed with a gas whose thermal conductivity is substantially different than that of air. Hydrogen or hydrogen rich gases such as propane, acetylene, and natural gas will provide up-scale readings.

Argon is also a fairly good probe gas and may be used with complete safety. It provides a downscale reading.

Argon is also a fairly good probe gas and may be used with complete safety. It provides a downscale reading.

Acetone or isopropyl alcohol, in a fine tipped squirt bottle, may also be used to probe for the leaks; however, solids carried in with the liquid can plug small leaks. Such leak closures are usually temporary.

CAUTION: Acetone and other solvents will attack most paints and plastics and some gasket materials.

NOTE: ALL OF THE ABOVE MATERIALS OTHER THAN ARGON ARE INFLAMMABLE. USE CAUTION.

Another method for leak hunting is to apply vacuum putty over suspected areas and watch for a pressure drop when the leak is covered.

The leak detection feature on the GT-340A is effective on Station 1 only for any pressure between atmosphere and 4 millitorr. Below 4 millitorr the gauge should be switched to its normal LOW-pressure scale.

3.6 Operation of the Leak Detect Feature

A. Turn the gauge. Leave the selector switch on STA 1 HIGH and the slide switch in the PRES. Position.

B. Allow the system pressure to stabilize.

C. Rotate the L.D. ADJUST knob fully cw. And place the slide switch in the L.D. position.

D. Rotate the L.D. Adjust knob to bring meter nearly to zero.

E. Turn the selector switch to LOW – L.D. and adjust the LD knob to bring the meter on scale. The gauge is now in its most sensitive range, and any change in thermal conductivity of the gas within the system will quickly cause a change in meter reading.

F. Probe the suspected areas with a suitable gas and watch for changes in meter deflection.

G. When through with the L.D. feature, return the slide switch to PRES. And the knob to full cw. position.

NOTE: The above procedure makes it possible to keep the meter pointer on scale at all times. Improper adjustments whish drive the meter severely off scale downward will cause overheating of the sensing thermistor. Severe off-scale upward deflection will cause abnormal cooling of the thermistor. In either case the gauge may then appear to be inoperative. To correct the condition, return to step "A" above. Do not allow the gauge to remain in the L.D. position with the meter reading off-scale.

4.0 MAINTENANCE

4.1 Cleaning The Sensing Tube

1. Disconnect and remove the tube from the vacuum system.

2. Wash the tube interior with a hot water and detergent solution (Joy and Alconox are good). Agitate gently.

3. Rinse thoroughly with hot water.

4. Rinse with clean acetone or isopropyl alcohol.

5. Dry tube by heating moderately for several hours and/or by evacuating on a water aspirator. Do not use compressed air.

4.2 Re-calibration

The GT-340A and GT-345A Gauges are carefully calibrated at the factory before shipment. Each GT-034 Sensing Tube is also pre-calibrated so that it can be plugged into a gauge circuit and used without the need for further adjustment.

Drift in the calibration or zero setting of the gauge reading is usually due to contamination of the sensing tube by oil vapor or process contaminants. Cleaning as specified in Section 4.1 will frequently restore the original accuracy. Should this fail, instillation of a new GT-034A Tube is recommended.

4.2.1 Sensing Tube Re-calibration

In cases where, after cleaning the sensing tube, a minor error in pressure or zero reading remains, the tube calibration can be adjusted as follows:

1. Install the sensing tube in the vacuum system and pump down to less than 1 millitorr

2. Provide temporary connections from the tube cable socket, contact 1 and 3, to respective pins on the sensing tube. This temporary connection should be made in such a way that the

end of the locating key at the center of the tube pin circle is exposed while the gauge is operating.

3. Insert a small screwdriver into the hole in the locating key and engage the potentiometer which is located in the tube base. Adjust for zero meter reading.

4.2.2 Gauge Circuit Calibration

All gauge circuits are factory adjusted to produce a specified output under standard operating conditions. When new precalibrated tubes are connected to a correctly adjusted gauge circuit, the pressure should read properly over the entire scale. Some variation is to be expected at the atmospheric end of the scale. In general, at full atmospheric pressure the meter pointer should rest over the black area on the scale.

Should the gauge fail to read properly when used with a new tube, the following adjustments should be made.

1. First, adjust the bridge voltage to exactly 10 volts, using an accurate voltmeter. Potentiometer R-16 on the printed wiring board is used for this adjustment and the voltage can be measured at the bridge voltage terminals. (See Fig.3).

2. With the sensing tube exposed to atmospheric pressure and at normal room temperature, adjust R-11 (for Station 1) or R-12 (for Station 2) to bring the meter to exactly full scale.

3. Pump the sensing tube down to less than 1 millitorr. With the range switch in the LOW position the meter should read zero. If necessary, touch up the bridge voltage adjustment to obtain a zero reading. NOTE: changing the bridge voltage affects both sensing tube stations.

4. Recheck the atmospheric full scale reading (step 2) and the zero reading (step 3) as there is a slight interaction between these adjustments.

5. The 100-millitorr full scale reading on the LOW scale probably will not require adjustment. However, if it is felt to be inaccurate and a gauge of known accuracy is available, correction can be made by adjusting potentiometer R-9 (for Sta. 1) or R-10 (for Sta. 2).

Gauge repair and re-calibration service is available at the factory. For information, contact for local MYERS VACUUM sales office or the MYERS VACUUM Order Service Dept. Myers Vacuum, Kittanning, Pa 16201.

5.0 REPLACEMENT PARTS LIST FOR THE GT-340A AND GT-345A THERMISTOR TYPE VACUUM GAUGES

MINIMUM ORDER BILLING OF $40.00 PER ORDER. PLEASE INCLUDE PART NNUMBER AND DESCRIPTION OF EACH PART ORDERED.

DESCRITPION	PART NO.
Sensing Tube, Type GT-034	277289
Control Unit, Type Gt-005A	5506611

6.0 ACCESSORIES

Cable Assemble for Sensing Tube

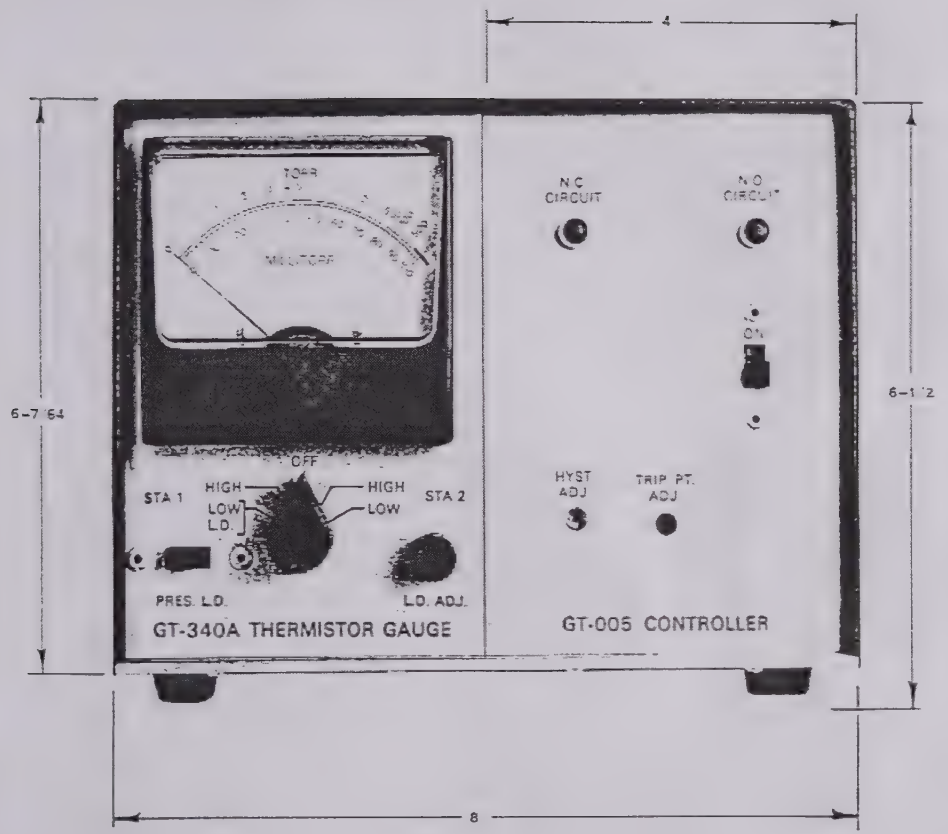
	Station 1	Station 2
10 ft. length	5505863-1	5505889-1
15 ft. length	5505863-2	5505889-2
25 ft. length	5505869-9	5505889-3
50 ft. length	5505863-4	5505889-4
100 ft. length	5505863-5	5505889-5

Panel Mounting Kit, Type PK-002	277243
Vacuum Grease, Celvacene Medium, 4 oz.	269352-11
Leak Sealant, Celvaseal Silicone, Brush Bottle	271375
Leak Sealant, Celvaseal Silicone, Spray Can	271373

7.0 SCHEMATIC

This section contains the following Electrical Schematics:

7.1	GT-340A	C-5506329
7.2	GT-005A	C-5506616



NOTE; DEPTH OF CABINET IS 6-1/2 INCHES.

FIG. 1 SIZE AND CONTROL IDENTIFICATION FOR TYPE GT-345 THERMISTOR GAUGE / CONTROLLER

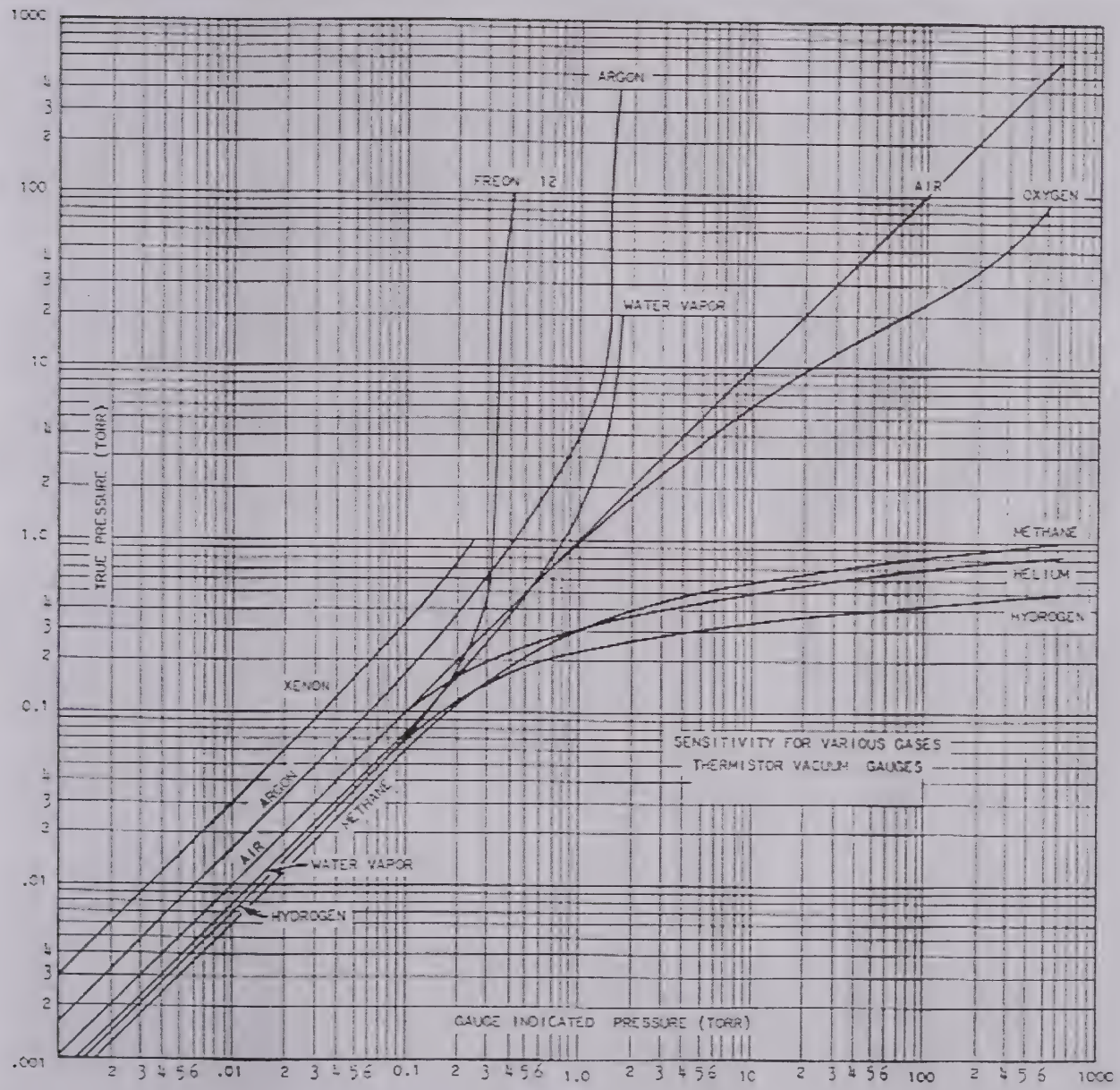
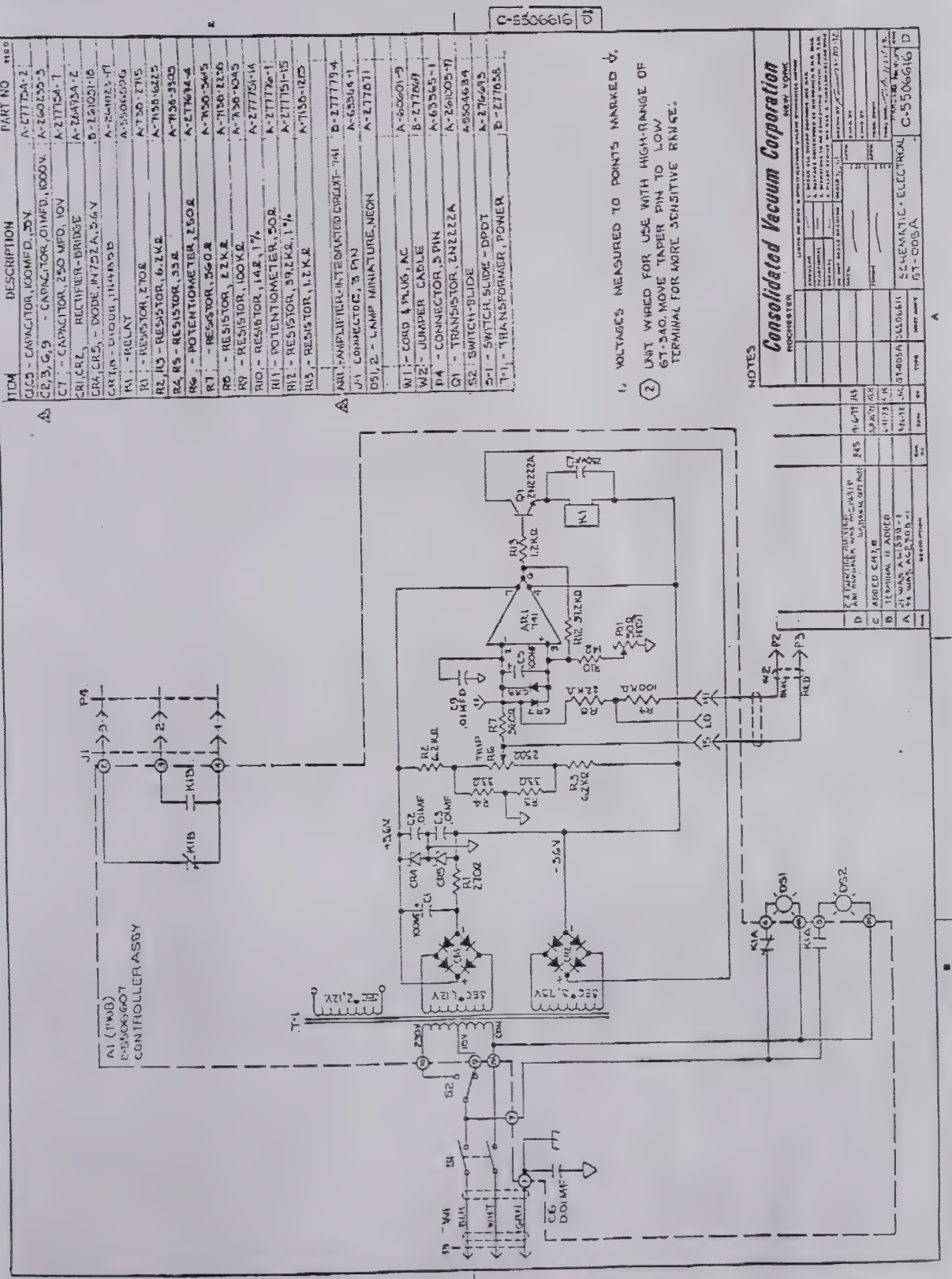
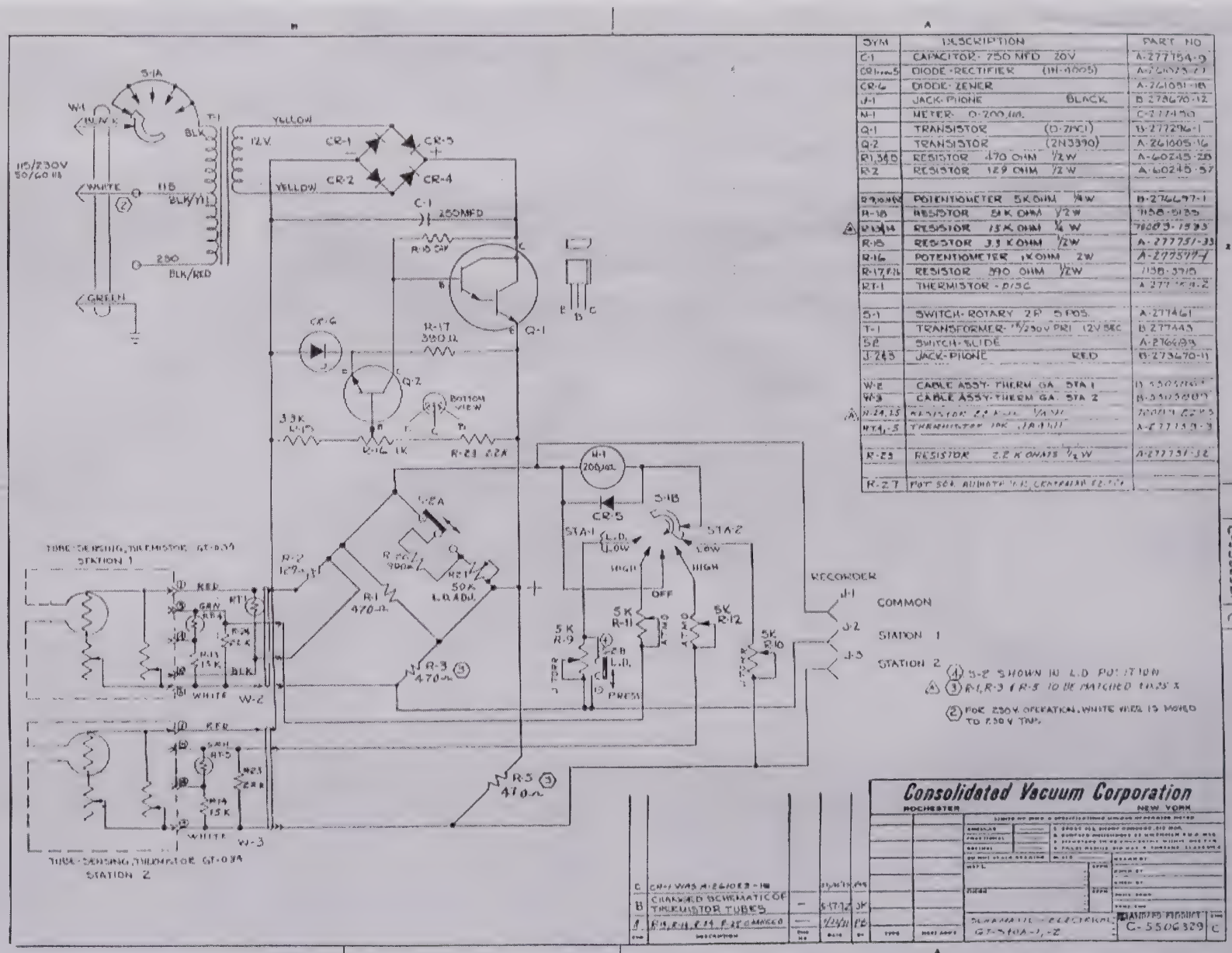


CHART 1 SENSITIVITY FOR VARIOUS GASES– TYPE GT–340A & GT–345 A VACUUM GAUGES


C-5506616 D1
ITEM DESCRIPTION PART NO
C1,C5 - CAPACITOR, 100MFD, 25V A-277754-2
C2,3,C9 - CAPACITOR, .01MFD, 1000V. A-260255-5
C7 - CAPACITOR, 250 MFD, 10V A-277754-1
CR1,CR2, RECTIFIER-BRIDGE A-264934-2
CR4,CR5, - DIODE, IN752A, 5.6V B-261001-16
CR6 - DIODE, IN4004 A-264102-41
K1 - RELAY A-260662-6
R1 - RESISTOR, 270Ω A-7136-2715
R2,R3 - RESISTOR, 6.2KΩ A-7136-6225
R4,R5 - RESISTOR, 33Ω A-7136-3305
R6 - POTENTIOMETER, 250Ω A-277694-4
R7 - RESISTOR, 360Ω A-7136-3615
R8 - RESISTOR, 2.2KΩ A-7136-2225
R9 - RESISTOR, 100KΩ A-7136-1045
R10 - RESISTOR, 1.4Ω, 1% A-277751-14
R11 - POTENTIOMETER, 50Ω A-277776-1
R12 - RESISTOR, 39.2KΩ, 1% A-277715-15
R13 - RESISTOR, 1.2KΩ A-7136-1225
AR1 - AMPLIFIER-INTEGRATED CIRCUIT- 741 B-2777794
J1 CONNECTOR, 3 PIN A-653641-1
DS1,2 - LAMP MINIATURE, NEON A-277871
W1 - CORD & PLUG, AC A-260601-9
W2 - JUMPER CABLE B-277869
P4 - CONNECTOR, 3 PIN A-653651-1
Q1 - TRANSISTOR, 2N2222A A-261005-17
S2 - SWITCH-SLIDE A-8504634
S1 - SWITCH, SLIDE - DPDT A-276695
T1 - TRANSFORMER, POWER B-277658
1. VOLTAGES MEASURED TO POINTS MARKED ⏚.
2 UNIT WIRED FOR USE WITH HIGH-RANGE OF GT-340, MOVE TAPER PIN TO LOW TERMINAL FOR MORE SENSITIVE RANGE.
NOTES
Consolidated Vacuum Corporation
ROCHESTER NEW YORK
SCHEMATIC - ELECTRICAL
GT-005A
C-5506616 D
A1 (PWB) C-5506607 CONTROLLER ASSY
J1
P4
K1A
K1B
S1
S2
T1
CR4
CR5
DS1
DS2
Q1
AR1
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12
R13
C1
C2
C3
C5
C6
C7
C9
W1
W2
P1
P2
P3
+36V
-36V
115V
230V
COM
TRIP
RUN
START
.01MFD
.05MF
100MF
50MF
2.2MΩ
100KΩ
5.6KΩ
6.2KΩ
1.2KΩ
270Ω
360Ω
2.2KΩ
100Ω
50Ω
39.2KΩ
1.4Ω
33Ω
6.2KΩ
1.2KΩ
2N2222A
741
12V
35V



SYM	DESCRIPTION	PART NO
C-1	CAPACITOR- 750 MFD 20V	A-277754-9
CR1 thru 5	DIODE-RECTIFIER (1N-4005)	A-276573-7
CR-6	DIODE-ZENER	A-276081-18
J-1	JACK-PHONE BLACK	B-278670-12
M-1	METER- 0-200 μa.	C-277490
Q-1	TRANSISTOR (D-27C1)	B-277296-1
Q-2	TRANSISTOR (2N3390)	A-276005-16
R1,3&5	RESISTOR 470 OHM ½W	A-60245-28
R-2	RESISTOR 1.29 OHM ½W	A-60245-57
R-9 thru 12	POTENTIOMETER 5K OHM ¼W	B-276697-1
R-10	RESISTOR 5K OHM ½W	1158-5139
R-13 & 14	RESISTOR 15K OHM ¼ W	70003-1593
R-15	RESISTOR 3.3 KOHM ½W	A-277751-33
R-16	POTENTIOMETER 1KOHM 2W	A-277577-1
R-17 & 18	RESISTOR 390 OHM ½W	1158-3715
RT-1	THERMISTOR - D136	A-277 [illegible]-2
S-1	SWITCH-ROTARY 2P 5 POS.	A-277461
T-1	TRANSFORMER- 115/230V PRI 12V SEC	B-277443
S2	SWITCH-SLIDE	A-276699
J-2&3	JACK-PHONE RED	B-278670-11
W-2	CABLE ASSY- THERM GA STA 1	B-550[illegible]
W-3	CABLE ASSY-THERM GA STA 2	B-550[illegible]
R-24,25	RESISTOR [illegible]	[illegible]
RT-4,5	THERMISTOR 10K (JA1001)	A-277[illegible]
R-23	RESISTOR 2.2 K OHMS ½W	A-277751-32
R-27	POT SEE ADJUSTABLE L.O. CONTROL R2,17	

C-5506329 C

NOTES:
4. S-2 SHOWN IN L.O. POSITION
3. R-1, R-3 & R-5 10 OHM MATCHED RESISTORS
2. FOR 230V OPERATION, WHITE WIRE IS MOVED TO 230 V TAP.

C	CHG WAS M-126 NOW M-1B		5/17/71	JK
B	CHANGED SCHEMATIC OF THERMISTOR TUBES	—	5/17/71	JK
A	R15, R14, R23, R27 CHANGED	—	12/4/70	PB

Consolidated Vacuum Corporation
ROCHESTER NEW YORK

SCHEMATIC - ELECTRICAL
GT-340A-1, -2
STANDARD PRODUCT
C-5506329 C

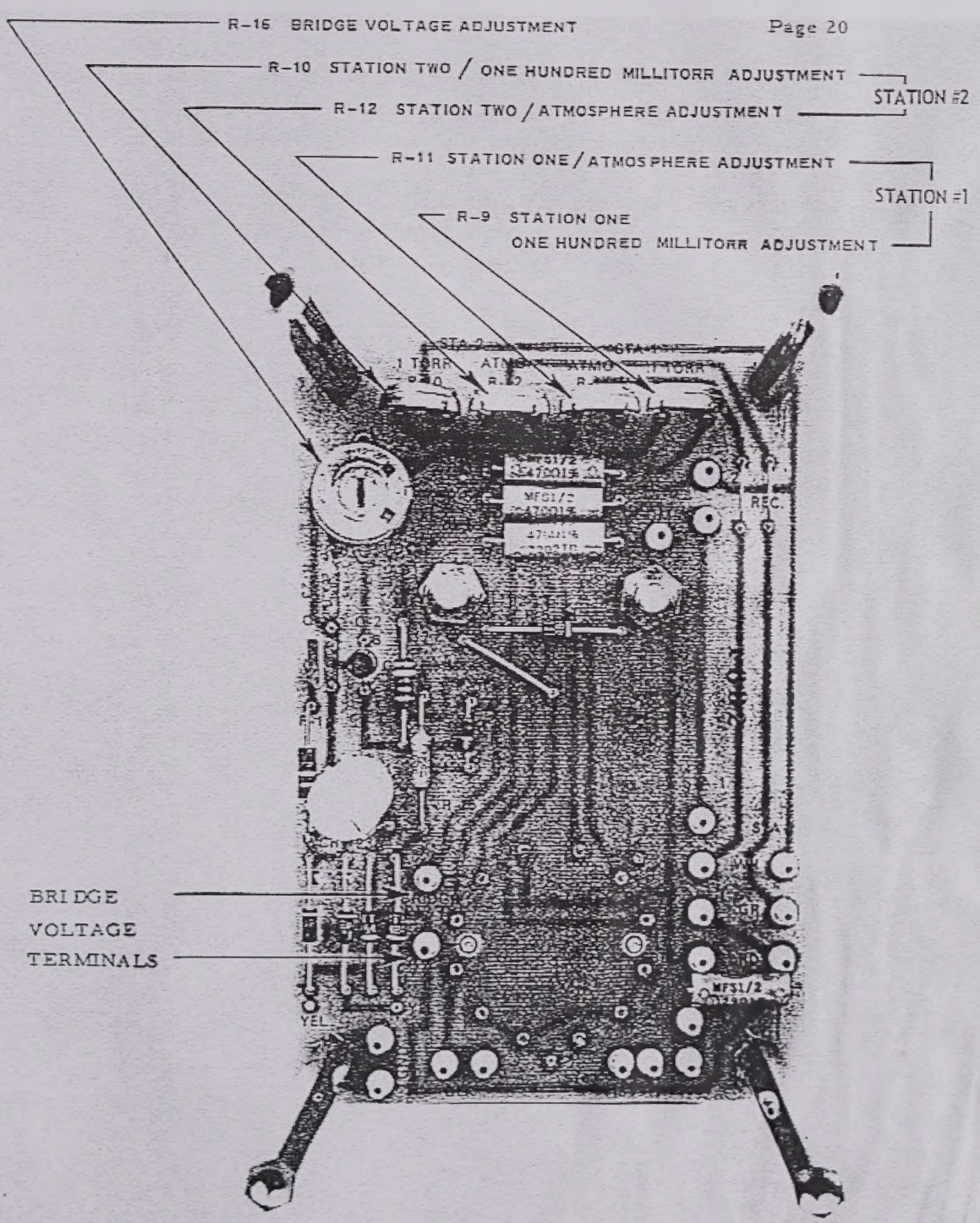


FIG. 3 CALIBRATION POTENTIOMETERS

MP MASTER
MA25166